ABSTRACT

The specification discloses a system and related method for determining characteristics of earth formations traversed by a borehole. An acoustic transmitter mounted on a tool, whether that tool is a wireline tool or a logging-while-drilling tool, imparts acoustic energy into the formation, and a plurality of receivers spaced apart from the transmitter and from each other receive acoustic energy responsive to the transmitter firing. Portions, or all, of each received signal are used to estimate source signals using an assumed transfer function. Each of those estimated source signals are then compared in some way to determine an objective function. This process is repeated for multiple assumed transfer functions, and at multiple starting times within the received signals. By searching for minimas of a plot of the objective function, characteristics of the earth formation may be determined.